

**I/WE CLAIM:**

1. An apparatus for treating a synthetic grass turf comprising:
  - a hollow cylinder including a plurality of hollow spikes extending radially and outwardly therefrom, each of the spikes having an orifice therethrough in fluid communication with an inner space defined within the hollow cylinder;
  - a support frame on which the hollow cylinder is rotatably supported at a predetermined height with respect to the synthetic grass turf when the frame is positioned on the synthetic grass turf; and
  - a pressurized fluid system for controllably supplying pressurized fluid into the hollow cylinder and thereby enabling fluid to be expelled from at least a number of the spikes to treat the synthetic grass turf when the apparatus moves on the synthetic grass turf thereby causing the hollow cylinder to rotate.
2. An apparatus as claimed in claim 1 wherein the pressurized fluid system comprises a pressurized air source, a pressurized air distributor operatively disposed within the hollow cylinder for selectively distributing pressurized air into a selected number of the hollow spikes, and a pressurized air line connecting the pressurized air distributor to the pressurized air source.

3. An apparatus as claimed in claim 2 wherein the pressurized fluid system comprises means for controlling the pressure of the pressurized air to be supplied to the hollow cylinder.
4. An apparatus as claimed in claim 2 wherein the support frame comprises means for adjusting the height of the hollow cylinder so that the spikes are adapted to penetrate a top surface of the synthetic grass turf to a selected depth thereof.
5. An apparatus as claimed in claim 2 wherein the pressurized air distributor comprises an air channel disposed parallel to a rotating axis of the hollow cylinder and supported within the hollow cylinder in a manner such that the air channel maintains a predetermined stationary position when the apparatus moves on the synthetic grass turf thereby causing the hollow cylinder to rotate, the air channel being connected to the pressurized air line and including an opening to expel pressurized air into a number of the hollow spikes at a moment when those hollow spikes move to a position within an area of the opening during a treatment operation.
6. An apparatus as claimed in claim 2 further comprising a vacuum system for collecting particulates blown from the synthetic grass turf.
7. An apparatus as claimed in claim 6 wherein the vacuum system comprises means for separating respective coarse and fine particulates from an air flow carrying the particulates.

8. An apparatus as claimed in claim 7 wherein the separating means comprise a cyclone device for separating the coarse particulates from the air flow.
9. An apparatus as claimed in claim 7 wherein the separating means comprise a filtering device for separating the fine particulates from the air flow.
10. An apparatus as claimed in claim 1 wherein the support frame comprises a plurality of wheels rotatably attached thereto and thereby enabling the apparatus to be moved on the wheels.
11. An apparatus for softening a synthetic grass turf which has compacted particulate matter layered thereon, the apparatus comprising:
  - a hollow cylinder including a plurality of hollow spikes extending radially and outwardly therefrom, each of the spikes having an orifice therethrough in fluid communication with an inner space defined within the hollow cylinder;
  - a support frame on which the hollow cylinder is rotatably supported at a predetermined height with respect to the synthetic grass turf, thereby a number of the spikes penetrating a top surface of the synthetic grass turf to a selected depth thereof when the frame is positioned on the synthetic grass turf;
  - a pressurized air system for controllably supplying pressurized air into the hollow cylinder and thereby enabling air jets to be blown from at least a number of the spikes to dislodge the compacted particulate matter layered on the

synthetic grass turf when the apparatus moves on the synthetic grass turf thereby causing the hollow cylinder to rotate; and

a vacuum system for collecting particulate matter blown from the synthetic grass turf, the vacuum system including means for separating the particulate matter from an air flow carrying the particulate matter.

12. An apparatus as claimed in claim 11 wherein the pressurized air system comprises an air channel disposed parallel to a rotating axis of the hollow cylinder and supported within the hollow cylinder in a manner such that the air channel maintains a predetermined stationary position when the hollow cylinder rolls on the synthetic grass turf, the air channel being in fluid communication with a pressurized air source and including an opening to expel pressurized air into a number of the hollow spikes at a moment when these hollow spikes move to within an area of the opening during a softening operation.
13. An apparatus as claimed in claim 12 wherein the support frame comprises means for adjusting the predetermined height of the hollow cylinder to ensure a selected penetration depth of the spikes into the synthetic grass turf.
14. A method for treating a synthetic grass turf, comprising a step of directing pressurized fluid into a depth of the synthetic grass turf for treatment, using a hollow spike roller rolling on the synthetic

grass turf, to enable fluid to be expelled from a number of hollow spikes that penetrate a top surface of the synthetic grass turf to the depth thereof.

15. A method as claimed in claim 14 wherein pressurized air is directed into the depth of the synthetic grass turf to blow particulate matter layered on the synthetic grass turf.
16. A method as claimed in claim 15 further comprising steps of uplifting the blown particulate matter and returning the blown particulate matter to the synthetic grass turf.
17. A method as claimed in claim 15 comprising a step of adjusting the penetration depth of the hollow spikes into the synthetic grass turf to blow different particulate component layers of the synthetic grass turf.
18. A method as claimed in claim 15 comprising a step of adjusting a start point of blowing pressurized fluid from each hollow spike with respect to an angular position of the spike, to control the depth to which the pressurized air is directed into the synthetic grass turf.
19. A method as claimed in claim 15 comprising a step of controlling a duration of blowing pressurized fluid from the respective hollow spikes for a particular performance in various treatment operations.

20. A method as claimed in claim 14 wherein the fluid comprises water for flushing a drainage system beneath the synthetic grass turf.
21. A method as claimed in claim 14 wherein the fluid comprises liquid resilient material for adding resiliency and impact absorption to the synthetic grass turf.